

## **Increased Moisturization Efficacy using Hydroxyalkylurea**

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### **BACKGROUND OF THE INVENTION**

The present invention relates to a personal care composition using hydroxyalkylurea in combination with other moisturizing agents in a synergistically moisturizing effective ratio, which has increased moisturization efficacy.

A significant segment of the global population uses products to moisturize their skin and hair, and such segment continues to grow at a substantial rate. Unfortunately, many of these products do not actually moisturize; they simply give the appearance of moisturization by reducing fine lines and/or flaking and adding shine. Further, when trying to provide or increase moisturizing efficacy, many of the moisturizing products currently on the market leave a heavy, greasy feel, which consumers find undesirable.

Hydroxyalkylureas are known in the art. For example, US Patent No. 5,858,549 discloses hydroxyalkylurea crosslinking agents and compositions which utilize such agents for use on natural or synthetic substrates or in the preparation of coatings. Hydroxyalkylureas are also disclosed as a component in thermosetting binders in US Patent No. 6,140,388 and in personal care products and detergent compositions in US Patent No. 5,880,076 and DE. 27 03 185. However, none of these patents disclose the use of hydroxyalkylureas in combination with other moisturizing agents to increase the moisturizing efficacy of personal care compositions.

Surprisingly, it has now been found that personal care compositions comprising hydroxyalkylureas in combination with other moisturizing agents

provide not only the perception of moisturization, but also actual increased moisturization efficacy. Such personal care compositions provide an enhanced smooth feel as well as enhanced flexibility, elasticity, suppleness and firmness without leaving a heavy or greasy feel.

#### SUMMARY OF THE INVENTION

The present invention relates to a personal care composition comprising at least one hydroxyalkylurea in combination with at least one other moisturizing agent, which provides not only the perception of moisturization, but also actual increased moisturization efficacy. Such personal care compositions provide an enhanced smooth feel as well as enhanced flexibility, elasticity, suppleness and firmness without leaving a heavy or greasy feel.

#### BRIEF DESCRIPTION OF THE FIGURES

Figure 1 depicts the relative skin moisture content of the synergy between hydroxyalkylurea and ammonium lactate at a ratio of 5:0.05.

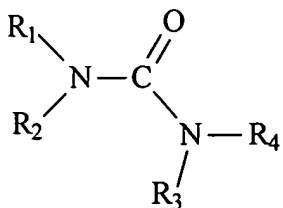
Figure 2 depicts the relative skin moisture content of the synergy between hydroxyalkylurea and ammonium lactate at a ratio of 1:1.

Figure 3 depicts the relative skin moisture content of the synergy between hydroxyalkylurea and sorbitol at a ratio of 1:1.

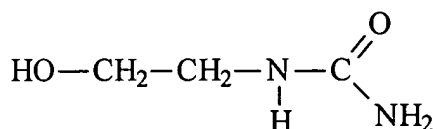
#### DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a personal care composition comprising at least one hydroxyalkylurea in combination with at least one other moisturizing agent, which provides not only the perception of moisturization, but also actual increased moisturization efficacy. Such personal care compositions provide an enhanced smooth feel as well as enhanced flexibility, elasticity, suppleness and firmness without leaving a heavy or greasy feel.

Hydroxyalkylureas, as used herein, are derived from urea and are of the general formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> each represent, independently of one another, hydrogen, a lower C<sub>1-4</sub>alkyl or a lower C<sub>2-6</sub>hydroxyalkyl group, which may contain from 1 to 5 hydroxyl or hydroxyalkyl groups, providing that at least one of the radicals R<sub>1</sub> – R<sub>4</sub> is a hydroxyalkyl or oligohydroxyalkyl group. A particularly useful hydroxyalkylurea is N-2-hydroxyethylurea with the structure



The personal care composition also includes at least one moisturizing agent. Such moisturizing agents are known in the art and include without limitation occlusion compounds such as petrolatum, mineral oils, vegetable oils, triglycerides, lanolins and their derivatives, unsaturated fatty acids and their derivatives, silicones, and some emollients; humectants such as glycerin, sorbitol, lactates (including but not limited to sodium, ammonium, and potassium salts), polyols (e.g. propylene glycol), polyethylene glycol (200-600), and Sorbeth-30; natural moisturizing factors (NMFs) such as urea, lactic acid, and sodium pyrrolidone carboxylic acid (NaPCA); liposomes, natural and vegetal moisturizing agents such as glycerin, serine, chitosan PCA, sodium hyaluronate, hyaluronic acid, microsponges, soluble collagen, modified protein, sugars, monosodium L-glutamate, lecithins and phospholipids and their derivatives; alpha and beta hydroxy acids such as glycolic acid, lactic acid, citric acid, maleic acid and salicylic acid; polymeric moisturizers such as polysaccharides and their derivatives, polyacrylates, and polyquaternium-51; and amino acids such as glutamic acid, aspartic acid, and lysine. As used herein, all acids are intended to include the salts thereof. Particularly suitable moisturizers are petrolatum, mineral and vegetable oils, lanolins, glycerin, sorbitol, polyols, urea, lactic acid,

lactates (including but not limited to sodium, ammonium, and potassium salts), alpha and beta hydroxy acids, sodium hyaluronate, hyaluronic acid, sugars, and pyrrolidone carboxylic acid (PCA).

The personal care composition will also include other optional ingredients, which are found in such formulations. For example, skin moisturizing compositions may also include other components commonly used in the industry, and these will vary greatly depending upon the type of composition and the functionality and properties desired. Without limitation, these components include emulsifiers, aesthetic modifiers, UV filters, humectants, moisturizers, emollients, solvents, chelating agents, vitamins, antioxidants, botanical extracts, pH adjusting and neutralizing agents, preservatives, fragrances, active ingredients (anti-aging agents, firming or toning agents, etc.), dyes and pigments. The hydroxyalkylurea of the present invention is compatible with most other components used in conventional personal care compositions. For example, cosmetic compositions may contain at least one component selected from the group comprising moisturizers, UV filters (both organic and inorganic UV actives), conditioning agents, emulsifiers, pH adjusters and neutralizers, emollients, solvents, antioxidants, vitamins, chelating agents, preservatives and fragrances. Skin care and cosmetic compositions may contain at least one component selected from the group consisting of vitamins, anti-aging agents, moisturizers, emollients, emulsifiers, surfactants, opacifiers, foaming agents, preservatives, antioxidants, pigments, dyes and active ingredients.

The hydroxyalkylurea will be present in a moisturizing effective amount, which will depend upon a variety of factors including the type and amount of other moisturizing agents and the type of personal care composition in which it is to be included. Typically, the hydroxyalkylurea will be present in an amount of from about 0.5 to 15.0%, particularly about 1 to 8%, more particularly about 1.5 to 5% by weight of the personal care composition.

The moisturizing agent will be present in a moisturizing effective amount, which will depend upon a variety of factors including the type of moisturizing agent, the amount of hydroxyalkylurea, and the type of personal care

composition in which it is to be included. Typically, the moisturizing agent will be present in an amount of from about 0.05 to 15%, particularly about 1 to 10%, more particularly about 2 to 6% by weight of the personal care composition.

The ratio of hydroxyalkylurea to moisturizing agent will be in a synergistically moisturizing effective ratio, typically be at least about 0.5:15, particularly at least about 1:5 and no more than about 15:0.05, particularly no more than about 5:1.

The combination of hydroxyalkylurea and moisturizer produce a synergistic relative moisturization efficacy. Thus, the combination has an increased moisturization efficacy over that expected; more than the added moisturization efficacy of the individual components alone.

Methods of manufacturing hydroxyalkylureas are known in the art. One known method is by reacting at least one ethanolamine with urea (1:1 molar concentrations) at elevated temperatures of about 80°C to 200°C with adequate sparging. Using this method, residual levels of about 0.1 to 1% ammonia are typically produced and remain in solution. The ammonia can be neutralized with any cosmetically suitable acid to form an ammonium salt. The ammonium salt and hydroxyalkylurea also produce a synergistic moisturization efficacy. Particularly suitable acids include lactic acid, glycolic acid, citric acid, maleic acid, acetic acid, and salicylic acid.

Personal care compositions include without limitation skin moisturizing lotions and creams including for the face and body, moisturizing cleansers and soaps, anti-aging products, nourishing creams and lotions, firming and toning products, shaving creams, deodorants, color cosmetics including foundations, makeups, and lipsticks, sun care products such as sunscreens, suntan lotions, and after-sun products, hair conditioners and cream rinses, and shampoos, hair styling products including hairsprays, gels, and mousses, personal care wipes, baby care products, and bath and shower products. Particularly suitable compositions are skin care compositions.

The personal care compositions comprising both hydroxyalkylurea and moisturizer not only have improved moisturization efficacy, but also provide

improved aqueous and emulsion freeze-thaw stability. Further, such compositions have a non-tacky, nongreasy feel when applied.

## EXAMPLES

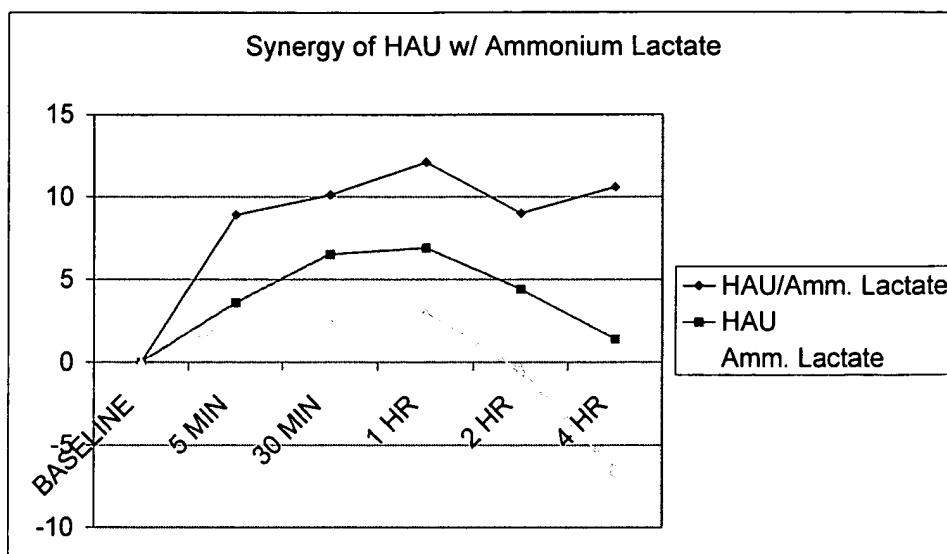
The following examples are presented to further illustrate and explain the present invention and should not be taken as limiting in any regard. All percents used are on a weight/weight basis.

In the examples below, the following procedures/tests are used. Aqueous solutions (along with formulated lotions) were applied to the volar forearm of panellists with dry skin. Solutions tested contained between 2.5 and 15% active levels of Hydroxyalkylurea and various moisturizing agents. The various individual moisturizing agents were also used in combination with Hydroxyalkylurea and the relative moisture contents in the skin were compared. Moisture levels were measured using a Corneometer (CM 825; CK industries) prior to and at various time intervals after application of forty microliters of each sample (Temperature ~21°C, Relative Humidity ~35%).

### Example 1 –

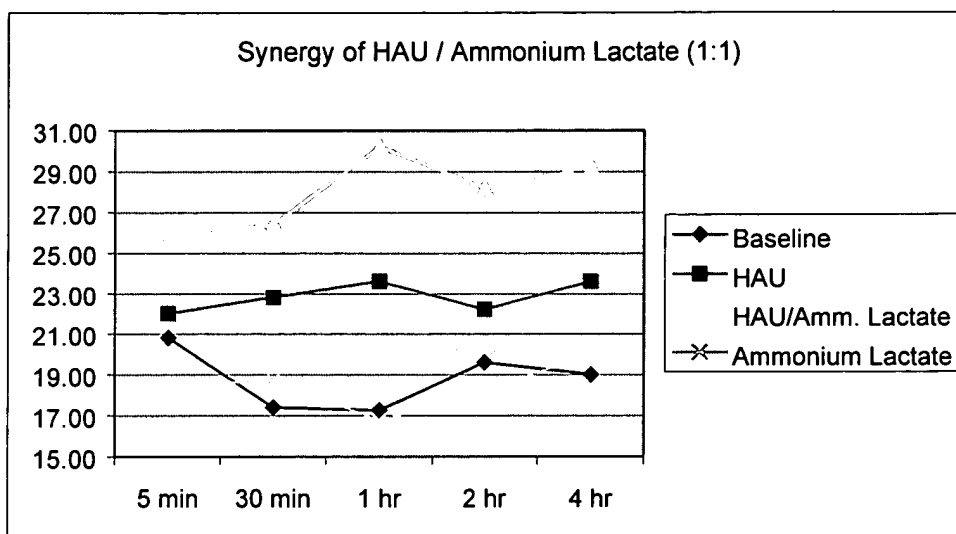
Hydroxyalkylurea (HAU), specifically Hydroxyethylurea, and the moisturizing agent, Ammonium Lactate (Amm. Lactate), were analyzed alone and in combination. Active levels used for the individual agents were HAU at 5% and Ammonium Lactate at 0.05%. The combination consisted of a total of 5% moisturizing ingredients at a ratio of 5:0.05 of HAU:Ammonium Lactate. Figure 1, below, shows the relative skin moisture content, initially and at 5 minutes, 15 minutes, 1hour, 2hours, and 4hours after application. The blend showed a significant increase in moisture over either individual moisturizing agent alone.

Figure 1



In another study, the active levels used for the individual agents were HAU at 5% and Ammonium Lactate also at 5%; while the combination consisted of a total of 5% moisturizing ingredients at a ratio of 1:1 of HAU:Ammonium Lactate. Figure 2, below, shows the relative skin moisture content, initially and at 5 minutes, 15 minutes, 1hour, 2hours, and 4hours after application. Once again the blend showed a significant increase in moisture over either individual moisturizing agent.

Figure 2



Example 2 –

Hydroxyalkylurea (HAU), specifically Hydroxyethylurea, and the moisturizing agent, Glycerin, were analyzed alone and in combination. Active levels used for the individual agents were HAU at 15% and Glycerin at 15%. The combination consisted of a total of 15% total moisturizing ingredients at a ratio of 1:1 of HAU:Glycerin. Table 1, below, shows the relative skin moisture content, initially and at 5 minutes, 15 minutes, 1 hour, and 2 hours after application. The blend showed a significant increase in moisture over either individual moisturizing agent.

Table 1

**Synergy of HAU / Glycerin (1:1) at 15% Active**

	<b><u>5 min</u></b>	<b><u>30 min</u></b>	<b><u>1 hr</u></b>	<b><u>2 hr</u></b>
Baseline	46.75	46.75	46.75	46.75
HAU	56.56	60.00	62.95	62.00
Glycerin	52.50	53.50	55.38	48.75
<b><i>Blend (1:1)</i></b>	<b><i>88.25</i></b>	<b><i>73.00</i></b>	<b><i>71.25</i></b>	<b><i>70.00</i></b>



### Example 3 –

Hydroxyalkylurea (HAU), specifically Hydroxyethylurea, and the moisturizing agent, Sorbitol, were analyzed alone and in combination. Active levels used for the individual agents were HAU at 15% and Sorbitol at 15%. The combination consisted of a total of 15% total moisturizing ingredients at a ratio of 1:1 of HAU:Sorbitol. Figure 3, below, shows the relative skin moisture content, initially and at 5 minutes, 15 minutes, 1 hour, and 2 hour after application. The blend showed a significant increase in moisture over either individual moisturizing agent especially after 4 hours time.

Figure 3

